**IT Applications Unit 3, AOS 1, Online Communities**

1. Complete the following, from pgs, 28- 32: **Transmission media**

**Networks are classified according to below and we will study the following:**

1. Network Categories: LAN, WAN
2. Network Architecture, client-server; peer-to-peer; internet peer-to-peer; intranet
3. Network communication standards
4. Network hardware and software
5. **Transmission media**
6. Network security

**Transmission media**

**Physical Transmission**

**Twisted – pair cable**

1. What is twisted pair cable?

A twisted pair cable is a cable made of eight wires twisted into four spate pairs, and then twisted again as a group. This helps to prevent outside interference because no wire is running parallel to any outside cables.

1. Why do new networks use CAT 5E or CAT 6 rather than CAT 3?

New networks use CAT 5E or CAT 6 cabling instead of CAT 3 because it is up to 100 times faster to transfer data. CAT 6 cabling also has less noise so can produce an even faster broadband speed.

1. What are some disadvantages of CAT 5E and why is it used in so many installations?

A disadvantage of CAT 5E is that it can only travel short distances, 85m at best. It is used in so many installations because it is a lot faster than other cabling.

1. What type of networks is this cable largely used in?

CAT 5E is mostly used in star networks.

**Coaxial Cable**

1. Describe the characteristics of this cable.

Coaxial cable contains two wires surrounded by insulation, a layer of braided copper or aluminium, tin, lead foil etc. and finally another layer of insulation. The braid serves to shield the signals from outside interference.

1. What network is it used in?

Coaxial Cable is used in a bus network, where the data travels in both directions away from the computer sending a message. Usually there aren’t any switches, and all the network traffic is carried along the wires, so any damage to the wiring completely disrupts the network.

**Fibre-optic cable**

1. Describe the characteristics of this cable.

Fibre-optic Cable consists of special glass or plastic strands that are capable of transmitting light pulses. As the light can’t be interfered with by electromagnetic signals, it can reliably carry data up to 2km. Multiple users can use a single strand of cable at once, making fibre-optic very efficient.

1. Why is fibre-optic cable often used to connect major switches inside buildings as well as between buildings?

Fibre-optic cable is capable of transmitting 100Mbps and can send large files and data amounts, which would need to be sent from one major switch to another. Because fibre-optics can move data with such speed, it is very efficient to use it to connect large network machines.

1. What are the disadvantages of this cable?

Fibre-optic cable is only capable of sending data one way, with a transmitter at one end and a receiver at the other. To send data two ways, two separate thread and respective switches must be used. Also, if the cable becomes damaged of bent, the light pulses will not reflect and transmit down the cable properly.

**Wireless Transmission,** p 30

**Radio Waves**

1. What is required for radio transmissions to occur?

Radio Transmission occurs by having a radio transmitter broadcast the radio signal and a receiver to accept it.

1. Wi-Fi networks use radio waves. What are its advantages over a cable network and what are its disadvantages?

Advantages include its flexibility to transmit over long or short distances, and that it doesn’t need cabling to connect the network, meaning it can be used in much harsher environments. No cables are required so it can be used in heritage buildings where cables are not allowed to be seen. Wi-Fi is more mobile and doesn’t need a connection in one particular spot. With added access points, retaining network connection is much easier through roaming.

Disadvantages include Wi-Fi is much slower than a cabled network, and also its susceptibility to noise and interference causing the signals to not transmit properly.

1. Describe the characteristics of Bluetooth.

Bluetooth is a type of standard that uses short-range radio waves to transmit data over a distance of up to 10 meters. It is only capable of transmitting data at 2Mbps, compared to Wi-Fi transmission of up to 108Mbps. It connects notebook computers in a meeting or in conjunction with PDAs or smart devices. Operates at 2.45 GHz

**Microwaves**

1. Describe the characteristics of microwave transmission.

Microwaves require line-of-sight transmission to handle very high data transmitting rates over short distance. They operate at between 3 and 3000 GHz, and the larger frequency allows it to pass through the Earth’s atmosphere much more easily.

1. What are the limitations of microwave transmission?

Microwave transmission requires line-of-sight, meaning that if an object obstructs the signal between the dish and the receiver, it can become lost.

**Satellite**

1. Satellite transmission can be in what forms?

Satellite transmission can either be in the form of radio or microwaves.

1. What are the limitations of this form of transmission?

The waves that travel to the satellites must travel a great distance to get there and back to the receiving station on Earth, so the signal must be great amplified to find the desired destination.

1. Who might use this form of transmission?

Television companies, organisations using videoconferencing, people with GPS in their vehicles, internet users with satellite dishes (used for internet connection), and people in rural areas use satellite transmission, particularly when no other form of transmission is available.

**Infra-red**

1. Describe the characteristics of infra-red transmission.

Infra-red transmission uses the same technology as TV remote controls. It has a slow data transfer rate over short distances, and uses rays of light to transmit data, requiring line-of-sight. It cannot be seen by the naked eye and has a shorter wavelength than microwave radiation.

1. Why is radio wireless networking preferable to infra-red wireless networking?

Radio Wi-Fi doesn’t require line-of-sight, so can be used in buildings or areas where walls and objects would otherwise disrupt the signal of infra-red. Radio waves can also be transmitted over a greater range, so the area of access to the network is much greater and more adaptable.